PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
YOUME PATENT & LAW FIRM

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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)* 22 JUNE 2004 (22.06.2004)	
Applicant's or agent's file reference OPP030181KR	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/KR2004/000520	**12 MARCH 2004 (12.03.2004)**	13 MARCH 2003 (13.03.2003)

International Patent Classification (IPC) or both national classification and IPC

IPC7 H01L 21/324

Applicant

SAMSUNG ELECTRONICS CO., LTD. et al

1. This opinion contains indications relating to the following items:

- [X] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [X] Box No. IV Lack of unity of invention
- [X] Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea	MAENG, Sung Jae
Facsimile No. 82-42-472-7140	Telephone No. 82-42-481-5727

Form PCT/ISA/237 (cover sheet) (January 2004)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/KR2004/000520

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material
   - ☐ a sequence listing
   - ☐ table(s) related to the sequence listing

   b. format of material
   - ☐ in wirtten format
   - ☐ in computer readable form

   c. time of filing/furnishing
   - ☐ contained in the international application as filed.
   - ☐ filed together with the international application in computer readable form.
   - ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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Box No. IV Lack of unity of invention

1. [X] In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has:

   [X] paid additional fees

   [ ] paid additional fees under protest

   [ ] not paid additional fees

2. [ ] This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

   [ ] complied with

   [ ] not complied with for the following reasons:

4. Consequently, this opinion has been established in respect of the following parts of the international application :

   [X] all parts.

   [ ] the parts relating to claims Nos. _____

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-27	YES
	Claims	none	NO
Inventive step (IS)	Claims	9-11,13-14,16-18,20-27	YES
	Claims	1-8,12,15,19	NO
Industrial applicability (IA)	Claims	1-27	YES
	Claims	none	NO

2. Citations and explanations :

The invention relates to: an apparatus and method of crystallizing amorphous silicon; an amorphous silicon layer; and an SLS method.

The following documents have been cited in the International Search Report:

D1: US 03/24905 A1 (Koichiro Tanaka) 06 February 2003
D2: KR 02-94062 (NEC) 16 December 2002
D3: WO 02/86954 A1 (Trustee of Columbia University) 31 October 2002
D4: US 03/42397 A1(Koichi Tatsuki et al.) 06 March 2003
D5: JP 05-226275(NEC) 03 September 1993

1. D1 provides a laser device, a laser irradiating method, and a manufacturing method of a semiconductor device. A laser irradiating device disclosed in D1 is constructed of plural lasers, an optical system, and a stage for moving the position of the laser beams. D1 describes an SLS method of amorphous silicon in the related art.

2. D2 discloses a laser crystallization method of amorphous silicon by controlling pulse width. The Figure 2 in D2 discloses a system comprising two lasers, an optical unit, and a moving stage for mounting a substrate in a chamber.

3. D3 discloses a method and system for processing a silicon thin film sample on a substrate. An irradiation beam generator is controlled to emit a successive irradiation beam pulse at a predetermined repetition rate. D3 also describes an SLS process of amorphous silicon.

4. D4 discloses a method of fabricating thin film transistors by crystallizing an amorphous silicon film, and a laser annealing apparatus comprising: a plurality of semiconductor laser devices; optical devices; and a moving stage for mounting a substrate.

5. D5 discloses an apparatus of laser annealing. The apparatus comprises an X-Y table for mounting a substrate, two laser sources, optical units, and beam synthesizers.

However, D1-D5 do not suggest a plurality of chambers wherein one of chambers loads a substrate while another of the chambers performs polycrystallization.

(Supplemental Box)

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of :

(Box No. V)

The invention claimed in Claims 1-27 is considered to be novel and industrially applicable.

However, the search has revealed that an amorphous silicon layer and an SLS method are not considered to have an inventive step since they are disclosed in D1-D5.
Claims 1-8, 12, 15 and 19 are considered to lack an inventive step over the admitted prior arts of combination of D1-D5.